

Name _____

Date _____

291 Midterm Review Packet

(Objectives, textbook review questions, review questions, answers to review questions)

291 First Semester Objectives

The students should be able to:

Chapter 1--Solving Equations and Inequalities

1. Use the order of operations to evaluate expressions.
2. Use formulas
3. Classify real numbers.
4. Use the properties of real numbers to evaluate expressions.
5. Translate verbal expressions into algebraic expressions and equations, and vice versa.
6. Solve equations using the properties of equality.
7. Evaluate expressions involving absolute values.
8. Solve absolute value equations
9. Solve inequalities.
10. Solve real-world problems involving inequalities.
11. Solve compound inequalities.
12. Solve absolute value inequalities.

Chapter 2--Linear Relations and Functions

1. Analyze and graph relations.
2. Find functional values.
3. Identify linear equations and functions.
4. Write linear equations in standard form and graph them.
5. Find and use the slope of a line.
6. Graph parallel and perpendicular lines.
7. Write the equation of a line given the slope and a point on the line.
8. Write the equation of a line parallel or perpendicular to a given line.
9. Draw scatter-plots.
10. Find and use prediction equations.
11. Identify and graph step, constant, and identity functions.
12. Identify and graph absolute value and piecewise functions.
13. Graph linear inequalities.
14. Graph absolute value inequalities.

Three Space

1. Determine the coordinates of points in three dimensions.
2. Graph planes in three dimensions.
3. Determine the equations of the traces.

Chapter 3--Systems of Equations and Inequalities

1. Solve systems of linear equations by graphing.
2. Determine whether a system of linear equations is consistent and independent, consistent and dependent, or inconsistent.
3. Solve systems of linear equations by using substitution.
4. Solve systems of linear equations by using elimination.
5. Solve systems of inequalities by graphing.
6. Determine the coordinates of the vertices of a region formed by the graph of a system of inequalities.
7. Find the maximum and minimum values of a function over a region.
8. Solve real-world problems using linear programming.
9. Solve systems of linear equations in three variables.
10. Solve real-world problems using systems of linear equations in three variables.

Chapter 4--Matrices

1. Organize data in matrices.
2. Solve equations involving matrices.
3. Add and subtract matrices.
4. Multiply a matrix by a scalar.
5. Multiply matrices.
6. Use the properties of matrix multiplication.
7. Evaluate the determinant of a 2×2 matrix.
8. Evaluate the determinant of a 3×3 matrix.
9. Solve systems of two linear equations by using Cramer's Rule.
10. Solve systems of three linear equations by using Cramer's Rule.
11. Determine whether two matrices are inverses.
12. Find the inverse of a 2×2 matrix.
13. Write matrix equations for systems of equations.
14. Solve systems of equations using matrix equations.

Chapter 5--Polynomials

1. Multiply and divide monomials
2. Use expressions written in scientific notation.
3. Add and subtract polynomials.
4. Multiply polynomials.
5. Divide polynomials using long division.
6. Divide polynomials using synthetic division.
7. Factor polynomials.
8. Simplify polynomial quotients by factoring.
9. Simplify radicals.
10. Use a calculator to approximate radicals.
11. Simplify radical expressions.
12. Add, subtract, multiply, and divide radical expressions.
13. Write expressions with rational exponents in radical form, and vice versa.
14. Simplify expressions in exponential or radical form.
15. Solve equations containing radicals.
16. Solve inequalities containing radicals.
17. Add and subtract complex numbers.
18. Multiply and divide complex numbers.

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HONORS ALGEBRA 2 MIDTERM REVIEW

The following problems are review problems from your textbook that you can do for extra practice. Make sure to check your answers in the back of the textbook. The answers are provided for any even problems. These problems, along with your midterm review packet, should give you a good review for the midterm exam. Good luck!!

Chapter 1: Solving Equations and Inequalities

p. 15 # 21, 23, 29 – 33 odd

p. 25 # 59, 62

62) answer is $\frac{-4x}{x-1} = y$

p. 49-50 # 33, 49, 51

Chapter 2: Linear Equations, Functions, and Linear Inequalities

p. 94 # 41 (piecewise function) + p. 102-104 # 26, 37, 39, 47, 49

26) answer is slope = $\frac{5}{6}$

Chapter 3: Systems of Equations and Inequalities

p. 120 # 29, 34

34) answer is: infinite # of solutions on the line $f = 6 - 2g$

p. 125 # 5 + p. 132 # 17 + p. 133 # 21 (look over linear programming) + p. 147-148 # 23, 27

Chapter 4: Matrices

p. 172 # 23 + p. 186 # 15, 27, 29 + p. 199 # 23, 25 + p. 211-213 # 20, 27, 35

20) answer = $\begin{bmatrix} 13 & -9 \\ 13 & -23 \end{bmatrix}$

Chapter 5: Polynomials, Factoring Polynomials, Radicals

p. 226-227 # 19, 33 + p. 242-243 # 9, 25, 27, 33, 35, 36, 37

36) answer $(t-2)(t^2+2t+4)$

p. 254 # 17, 19, 27, 29, 35, 39, 43 + p. 277-280 # 25, 27, 31, 45, 52, 61, 69, 71, 75

52) answer = $\frac{1}{9}$

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Review for Midterm
Chapters 1-5

Use scrap paper to solve problems and place answers on the lines provided.

Simplify

1. _____ $-2[-3(2-9)-6] / -5$

2. _____ $3(-12) + 24/8 + 6 \cdot (-\frac{1}{2})$

3. _____ $3[x^3 - 5(x^2 - 3x)] - [x + 4(x^2 - 2x)]$

4. _____ Solve. $\frac{3}{2}(7+y) - \frac{5}{2}(2y+1) = -6$

5. _____ Given $S = \frac{-1}{2}gt^2 + vt$, solve for g.

6. _____ Given $S = -56$, $t = 2$, and $v = 4$, find the value for g.

7. _____ Given $A = 2ngb + 4br$. Solve for b.

8. _____ Solve for n. $3(2-5n) - 4 < 20 - 6(3-2n)$

9. _____ Find the additive and multiplicative inverse for $\frac{4}{5}$.

10. _____ Find the additive and multiplicative inverse for -6.

11. _____ Solve for x. $|2x + 1| \leq 5$

12. _____ Solve for m. $|5 - 2m| > 7$

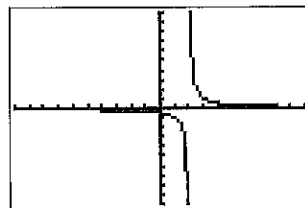
13. _____ Find three consecutive odd integers such that the sum of the last two is 7 less than three times the first.

14. _____ Is the relation a function? $\{(-1,2), (0,2), (.5,2), (5,2)\}$

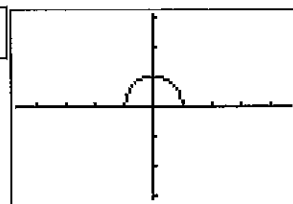
State the domain and range for the functions below.

15. D _____ $f(x) = \frac{1}{x-2}$

#15



#16



R _____

16. D _____ $f(x) = \sqrt{1-x^2}$

R _____

17. _____ Given $g(x) = x^2 - 1$, find $g(-3)$ and $g(7)$.

18. Given a line containing the points $(-2, 2)$ and $(2, -3)$:

a. _____ Find the equation of the line

b. _____ Find the slope of a line parallel to the given line.

c. _____ Find the slope of a line perpendicular to the given line.

19. Find the equations of the lines below in the form $Ax + By = C$.

a. _____ Through the point $(\frac{1}{2}, 3)$ and parallel to the line $4x + y = -3$.

b. _____ Through $(3, -2)$ and perpendicular to the line through points $(-1, -4)$ and $(1, 2)$.

20. Solve the system by the indicated method.

a. _____ $4x + 2y = 0$
 $3x + 4y = 5$ elimination

b. _____ $3x + y = 1$
 $5x - 2y = 9$ substitution

c. _____ $2x - 3y = 7$
 $-3x + 4y = -10$ Cramer's Rule

d. Redo any one of a-c using matrix equations.

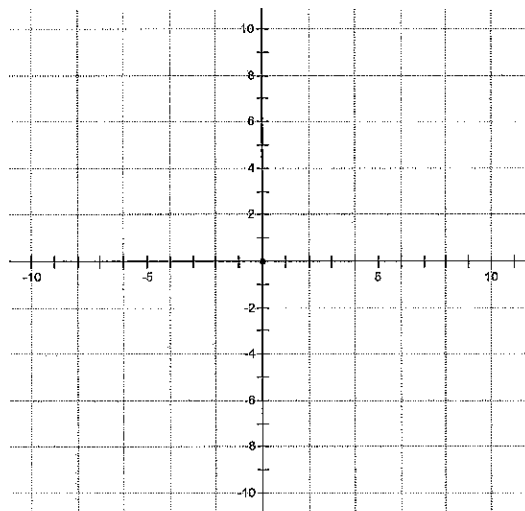
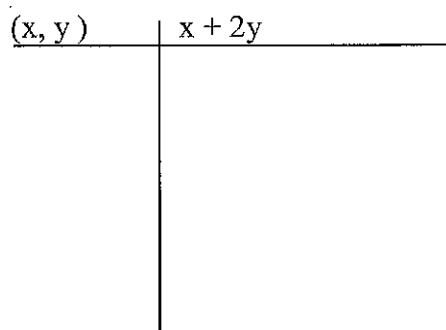
21. _____ Solve for k: $\begin{vmatrix} 4k & 3 \\ k & 2 \end{vmatrix} = -15$

22. _____ The sum of two numbers is 130. One of the numbers is 46 more than half the other number. What are the numbers?

23. _____ Traveling downstream, a boat can go 12 miles in 2 hours. Going upstream, it makes only $\frac{2}{3}$ the distance in twice the time. What is the rate of the boat in still water, and what is the rate of the current?

24. _____ Graph the system of inequalities. Determine the coordinates of the corner points. Given the objective function $f(x) = x + 2y$, determine the max and min values.

$$0 \leq x \leq 3 \quad 0 \leq y \leq -x + 5$$



25. _____ Evaluate the following determinant by expansion by

minors. $\begin{vmatrix} 3 & 1 & 2 \\ 4 & 3 & 0 \\ -1 & 3 & -4 \end{vmatrix}$

26. _____ Use Cramer's rule or elimination to solve the following system:

$$2x - y - z = 12$$

$$4x - y + 4z = 0$$

$$x + 2y + 2z = -4$$

27. _____ Find the area of the triangle using determinants. (1,2), (5,6), (-6, 12).

28. _____ Simplify. $\frac{(-2a^3d^{-2})^{-2}}{a^{-5}d}$

29. _____ Simplify. $\sqrt[5]{64a^6b^{15}c^{13}}$

Factor completely.

30. _____ $36n^2 - 60n + 25$

31. _____ $a^3b^3 + c^3$

32. _____ $16 - 49b^2c^4$

33. _____ $4x^2 - xy - 18y^2$

34. _____ $x^2 - y^2 - 3x - 3y$

35. _____ Solve over complex numbers. $2y^2 + 50 = 0$

36. _____ Use synthetic division to solve. $\frac{3x^3 - 19x^2 + 3}{3x - 1}$

Simplify.

37. _____ $\frac{5}{3 - \sqrt{3}}$

38. _____ $\frac{x^{\frac{3}{5}}}{\frac{1}{x^4}}$

39. _____ $\frac{1 + 3i}{2 - 5i}$

40. _____ $5^n \cdot 5^{n-8}$

41. _____ $4x^2 \cdot x^{-2}$

42. _____ $\sqrt{-32}$

43. _____ $\sqrt{-4} \cdot \sqrt{-12}$

44. _____ $\sqrt{-36a^3b^4}$

45. _____ $\sqrt{-8} \cdot \sqrt{-32}$

46. Graph the following point (3, 4, 7)

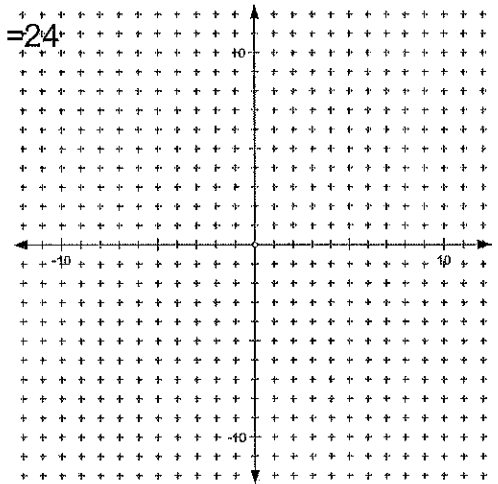
47. Graph the following equation. $3x + 4y + 6z = 24$

48. Graph the following piecewise function:

$$f(x) = \begin{cases} 4x & \text{if } 0 \leq x < 2 \\ -2x + 10 & \text{if } 2 \leq x < 5 \\ 2 & \text{if } 5 \leq x < 10 \end{cases}$$

What is the Domain? _____

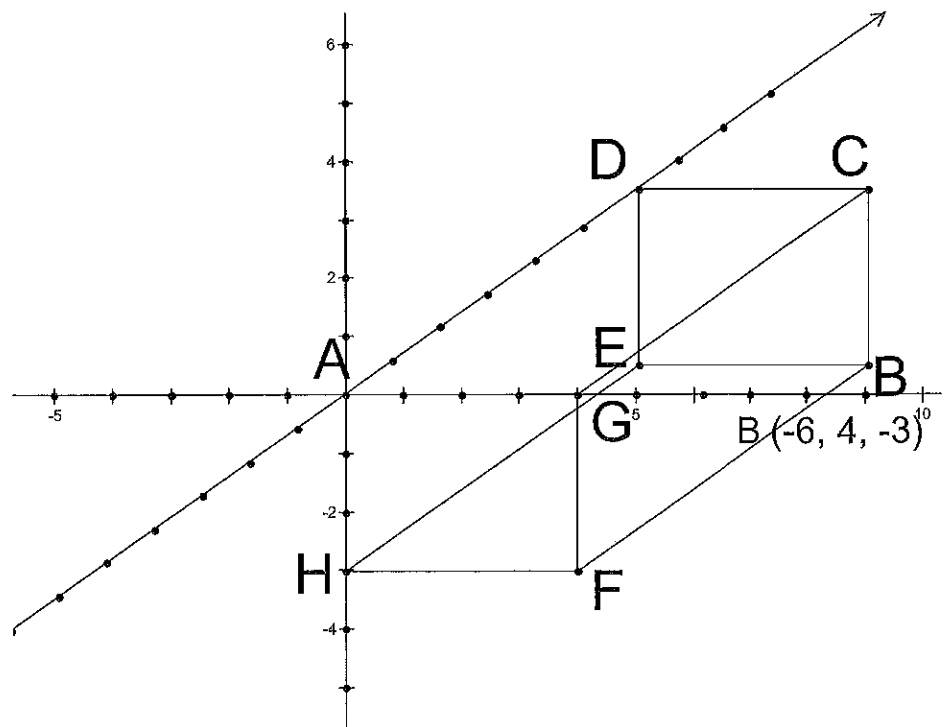
What is the Range? _____



49. A collection of 38 coins (nickels, dimes, and quarters) has a value of \$3.70. There are twice as many dimes as quarters. How many of each coin are in the collection?

50. Determine the coordinates of the following points.

- _____ A
- _____ C
- _____ D
- _____ E
- _____ F
- _____ G
- _____ H



291 Midterm Review Answer Key

1. 6
2. -36
3. $3x^3 - 19x^2 + 52x$
4. $\{4\}$
5. $g = \frac{-2(s-vt)}{t^2}$
6. 32
7. $b = \frac{A}{2ng + 4r}$
8. $\{n: n > 0\}$
9. additive inv.: $-\frac{4}{5}$
mult inv.: $\frac{5}{4}$
10. add. inv.: 6
mult inv.: $-\frac{1}{2}$
11. $\{x: -3 \leq x \leq 2\}$
12. $\{m: m < -1 \text{ or } m > 6\}$
13. 13, 15, 17
14. yes
15. D: $\mathbb{R} \ x \neq 2$
R: $\mathbb{R} \ f(x) \neq 0$
16. D: $-1 \leq x \leq 1$
R: $0 \leq f(x) \leq 1$
17. $g(-3) = 8$
 $g(7) = 48$
18. (a) $y = -\frac{5}{4}x - \frac{1}{2}$
(b) $m = -\frac{5}{4}$ (c) $m = \frac{4}{5}$
19. (a) $4x + y = 5$
(b) $x + 3y = -3$
20. (a) $(-1, 2)$
(b) $(1, -2)$
(c) $(2, -1)$
21. $k = -3$
22. $56 + 74$
23. rate of boat = 4 mph
rate of current = 2 mph
24. Corner Pts.
 $(0, 5) (3, 2) (9, 0) (3, 0)$
Max = 10 min = 0
25. 10
26. $(4, 0, -4)$
27. $34u^2$
28. $\frac{d^3}{4a}$
29. $2ab^3c^2 \sqrt[5]{2ac^3}$
30. $(6n-5)^2$
31. $(ab+c)(a^2b^2-abc+c^2)$
32. $(4+7bc^2)(4-7bc^2)$
33. $(4x-9y)(x+2y)$
34. $(x+y)(x-y-3)$
35. $\{\pm 5i\}$
36. $x^2 - 6x - 2 + \frac{1}{3x-1}$

37. $\frac{15+5\sqrt{3}}{6}$

38. $x^{\frac{7}{10}} = \sqrt[10]{x^7}$

39. $\frac{-13+11i}{29}$

40. 5^{2n-8}

41. 4

42. $4i\sqrt{2}$

43. $-4\sqrt{3}$

44. $6ab^2i\sqrt{a}$

45. -16

46. Do Not Do

47. Intercepts

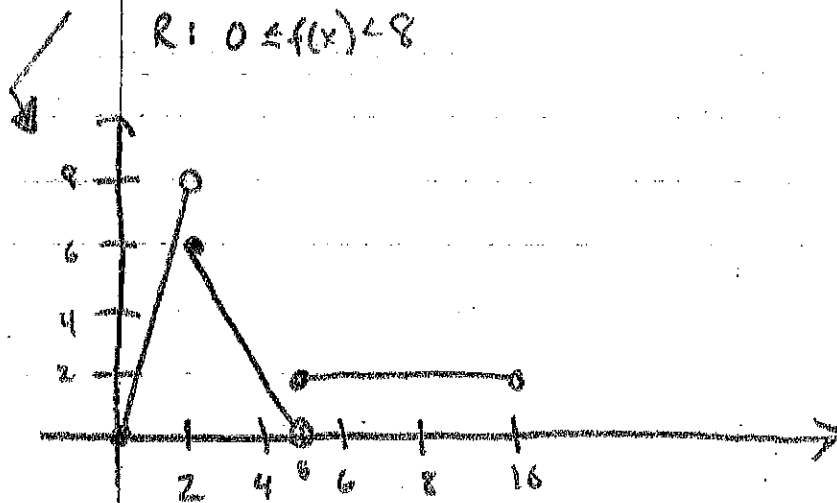
$(0, 0, 4)$

$(0, 6, 0)$

$(8, 0, 0)$

48. D: $0 \leq x < 10$

R: $0 \leq f(x) < 8$



49. 20N 12D 6Q

50. A $(0, 0, 0)$

C $(-6, 4, 0)$

D $(-6, 0, 0)$

E $(-6, 0, -3)$

F $(0, 4, -3)$

G $(6, 4, 0)$

H $(0, 0, -3)$

